REMARKS

Claims 1-6, 8-15, 17, 20, 21, 44, and 62-76 are pending. A clean copy of the claims as amended is attached to the end of this response for the Examiner's convenience.

I. Independent Claim 1:

Applicant has removed from the claims subject matter the Examiner considered to not meet the written description requirement, and in turn has added subject matter clearly having support, namely:

1. A system, comprising:
   an implantable stimulator, comprising:
   a rechargeable battery; and
   battery charging circuitry for setting the implantable stimulator to a zero volt mode when the rechargeable battery when it is depleted to zero volts and for setting the implantable stimulator to a regular charging mode otherwise; and
   an external system, comprising:
   a base station;
   an antenna/charging coil coupled to the base station that is used to inductively charge the rechargeable battery communicate with the stimulator; and
   a booster coil for resetting the battery circuitry from the zero volt mode to the regular charging mode.

This subject matter is supported at least by the following paragraphs in Applicant's specification:

> "An important function of the charging/communication system is the ability to recover the microstimulator when the rechargeable battery is completely dead. During such zero-volt recovery (ZVR), the microstimulator is defaulted to a depletion mode. A short duration, high amplitude magnetic field at a frequency of approximately 1.2 MHz is delivered to the microstimulator in order to set the microstimulator charging circuitry into a regular charging mode. The chair pad

> contains a booster coil 419 which is used to generate the short duration (less than 1 sec) magnetic field in the 1.2 MHz range.
>
> In the event . . . that the microstimulator battery voltage should drop to a complete depletion level or 'zero volt' mode, the microstimulator circuitry that controls the charging frequency will default to a state that causes the resonant frequency of the microstimulator circuitry and receiver coil to shift to about 1.2 MHz which is the Zero Volt Recovery (ZVR) frequency. Before normal charging of the microstimulator battery can begin, the base station temporarily operates in ZVR mode. In this ZVR mode, the booster coil is driven at the ZVR frequency (1.2 MHz), which resets the battery charging circuitry in the microstimulator to 127 KHz, by activating the front-end switches of the microstimulator setting the microstimulator to a trickle charge mode."

Applicant's Specification at ¶ [0066]-[0067].

These newly-added limitations are not present, even in combination, in the prior art references most recently cited by the Examiner (e.g., Schulman 2003/0078634; Mann 4,082,097). As such claim 1 and its dependent claims are believed to be patentable over the prior art, and not suffering from any infirmities under 35 U.S.C. § 112.

I. <u>New Independent Claim 62:</u>

Newly added claim 62 contains the same operative limitations from claim 1, but omits certain limitations not pertinent to battery charging. For example, the limitations of a "base station" and a communicating "antenna" have been removed from claim 62. The claims dependent on claim 62 largely mimic claim 1's dependent claims, with some broadening changes and with inconsistent claims removed. As such, claim 62 and its dependent claims are thus also believed to be patentable. Moreover, because Applicant has merely removed in claim 62 some limitations from claim 1, ***claim 62 is NOT restrictable from the case***.

* * * * *

Based on the above remarks, Applicant respectfully submits that pending claims 1-6, 8-15, 17, 20, 21, 44, and 62-76 are allowable, and requests that a Notice of Allowance issue for these claims

Respectfully submitted,

/ Terril Lewis/

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Clean Copy of Claims as Amended for Examiner's Convenience

1. (currently amended) A system, comprising:
   an implantable stimulator, comprising:
      a rechargeable battery; and
      battery charging circuitry for setting the implantable stimulator to a zero volt mode when the rechargeable battery when it is depleted to zero volts and for setting the implantable stimulator to a regular charging mode otherwise; and
   an external system, comprising:
      a base station;
      an antenna/charging coil coupled to the base station that is used to inductively charge the rechargeable battery communicate with the stimulator; and
      a booster coil for resetting the battery circuitry from the zero volt mode to the regular charging mode.

2. (currently amended) The system of claim 1, wherein the antenna/charging coil communicates with the stimulator using FSK telemetry.

3. (currently amended) The system of claim 2, wherein the antenna/charging coil communicates with the stimulator using on-off keying (OOK) telemetry.

4. (currently amended) The system of claim 1, wherein the external system further comprises current measuring circuitry for determining power consumption in the antenna/charging coil.

5. (currently amended) The system of claim 1, wherein the external system further comprises:

a printed circuit board (PCB) coupled to the antenna/charging coil and to the booster coil; and

sensing circuitry for sensing temperature included on the PCB.

6. (currently amended) The system of claim 5, wherein the external system further comprises automatic power shut-off circuitry for automatically shutting off power to the antenna/charging coil when the sensed temperature exceeds a predetermined level.

7. (canceled)

8. (previously presented) The system of claim 1, wherein the booster coil has a plurality of turns of wire in a plurality of layers wrapped around a coil spool.

9. (currently amended) The system of claim 1, wherein the external system further comprises:

power sensing circuitry for determining power consumption in the booster coil; and

automatic power shut-off circuitry for automatically shutting off power to the booster coil when the power consumption through the booster coil exceeds a predetermined power level.

10. (currently amended) The system of claim 1, wherein the external system further comprises:

a chair pad coupled to the base station;

a printed circuit board (PCB) contained in the chair pad;

sensing circuitry for sensing temperature included on the PCB; and

automatic power shut-off circuitry for automatically shutting off power to the booster coil when the sensed temperature exceeds a predetermined power level.

11. (currently amended) The system of claim 10, further comprising:

a chair pad cable that connects the chair pad to the base station; and

detection circuitry for automatically detecting disconnection of the chair pad cable from the chair pad.

12. (previously presented) The system of claim 10, wherein the chair pad is further comprised of:

a compliant housing made of foam; and

a coil assembly housing which contains the booster coil, the antenna/charging coil and the PCB,

wherein the foam housing encapsulates the coil assembly housing.

13. (currently amended) The system of claim 12, wherein the chair pad is further comprised of an exterior slipcover that surrounds the housing.

14. (currently amended) The system of claim 1,

wherein the booster coil is placed in a coil assembly with the antenna/charger coil,

wherein the booster coil and antenna/charging coil are wound over a spool coil in a configuration to present at least one substantially flat side,

wherein the coil assembly is fully encapsulated in an external housing.

15. (previously presented) The system of claim 14, wherein the housing is foam.

16. (canceled)

17. (currently amended) The system of claim 1, wherein the base station includes a speaker for generating an audible sound to signal a system event.

18-19. (canceled)

20. (currently amended) The system of claim 1, wherein the implantable stimulator is a microstimulator having a maximum length-wise dimension of about 3.5 centimeters and a maximum width of about 5 millimeters.

21. (previously presented) The system of claim 1, wherein the external system further comprises:

a sensor for detecting power levels in the antenna/charging coil; and

a variable output power supply that automatically adjusts downwards when the sensor detects power levels that exceed a predetermined level,

wherein the variable output power supply is contained within the base station.

22-43. (canceled)

44. (currently amended) The system of claim 4, wherein the external system further comprises automatic power shut-off circuitry for automatically shutting off power to the antenna/charging coil when the power consumption through the antenna/charging coil exceeds a predetermined level.

45-61. (canceled)

62. (new) A system, comprising:

an implantable medical device, comprising:

a rechargeable battery; and

battery charging circuitry for setting the implantable medical device to a zero volt mode when the rechargeable battery when it is depleted to zero volts and for setting the implantable medical device to a regular charging mode otherwise; and

an external system, comprising:

a charging coil coupled to the base station that is used to inductively charge the rechargeable battery; and

a booster coil for resetting the battery circuitry from the zero volt mode to the regular charging mode.

63. (new) The system of claim 62, wherein the external system further comprises current measuring circuitry for determining power consumption in the charging coil.

64. (new) The system of claim 63, wherein the external system further comprises automatic power shut-off circuitry for automatically shutting off power to the charging coil when the power consumption through the charging coil exceeds a predetermined level.

65. (new) The system of claim 62, wherein the external system further comprises:

a printed circuit board (PCB) coupled to the charging coil and to the booster coil; and

sensing circuitry for sensing temperature included on the PCB.

66. (new) The system of claim 65, wherein the external system further comprises automatic power shut-off circuitry for automatically shutting off power to the charging coil when the sensed temperature exceeds a predetermined level.

67. (new) The system of claim 62, wherein the booster coil has a plurality of turns of wire in a plurality of layers wrapped around a coil spool.

68. (new) The system of claim 62, wherein the external system further comprises:

power sensing circuitry for determining power consumption in the booster coil; and

automatic power shut-off circuitry for automatically shutting off power to the booster coil when the power consumption through the booster coil exceeds a predetermined power level.

69. (new) The system of claim 62, wherein the external system further comprises:

a chair pad for housing the charging coil and the booster coil;

a printed circuit board (PCB) contained in the chair pad;

sensing circuitry for sensing temperature included on the PCB; and

automatic power shut-off circuitry for automatically shutting off power to the booster coil when the sensed temperature exceeds a predetermined power level.

70. (new) The system of claim 69, wherein the chair pad is further comprised of:

a compliant housing made of foam; and

a coil assembly housing which contains the booster coil, the charging coil and the PCB,

wherein the foam housing encapsulates the coil assembly housing.

71. (new) The system of claim 70, wherein the chair pad is further comprised of a slipcover that surrounds the housing.

72. (new) The system of claim 62,

wherein the booster coil is placed in a coil assembly with the charger coil, wherein the booster coil and charging coil are wound over a spool coil in a configuration to present at least one substantially flat side,

wherein the coil assembly is fully encapsulated in an external housing.

73. (new) The system of claim 72, wherein the housing is foam.

74. (new) The system of claim 62, wherein the external system further comprises a speaker for generating an audible sound to signal a system event.

75. (new) The system of claim 62, wherein the implantable medical device is an implantable stimulator.

76. (new) The system of claim 62, wherein the external system further comprises:

a sensor for detecting power levels in the charging coil; and

a variable output power supply that automatically adjusts downwards when the sensor detects power levels that exceed a predetermined level.